Device Modeling Report

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DIODE MODEL

Pspice model Parameter	Model description
IS	Saturation Current
N	Emission Coefficient
RS	Series Resistance
IKF	High-injection Knee Current
CJO	Zero-bias Junction Capacitance
M	Junction Grading Coefficient
VJ	Junction Potential
ISR	Recombination Current Saturation Value
BV	Reverse Breakdown Voltage(a positive value)
IBV	Reverse Breakdown Current(a positive value)
TT	Transit Time

BIPOLAR JUNCTION TRANSISTOR MODEL

Pspice model parameter	Model description
NR	Reverse Emission Coefficient
RB	Base Resistance
RC	Series Collector Resistance
CJE	Zero-bias Emitter-Base Junction Capacitance
CJC	Zero-bias Collector-Base Junction Capacitance
TF	Forward Transit Time
TR	Reverse Transit Time

VOLTAGE CONTROLLED VOLTAGE SOURCE MODEL(VCVS)

E<Name><(+)Node><(－)Node>VALUE={Expression}

E<Name><(+)Node><(－)Node>TABLE={Expression}

VOLTAGE CONTROLLED CURRENT SOURCE MODEL(VCCS)

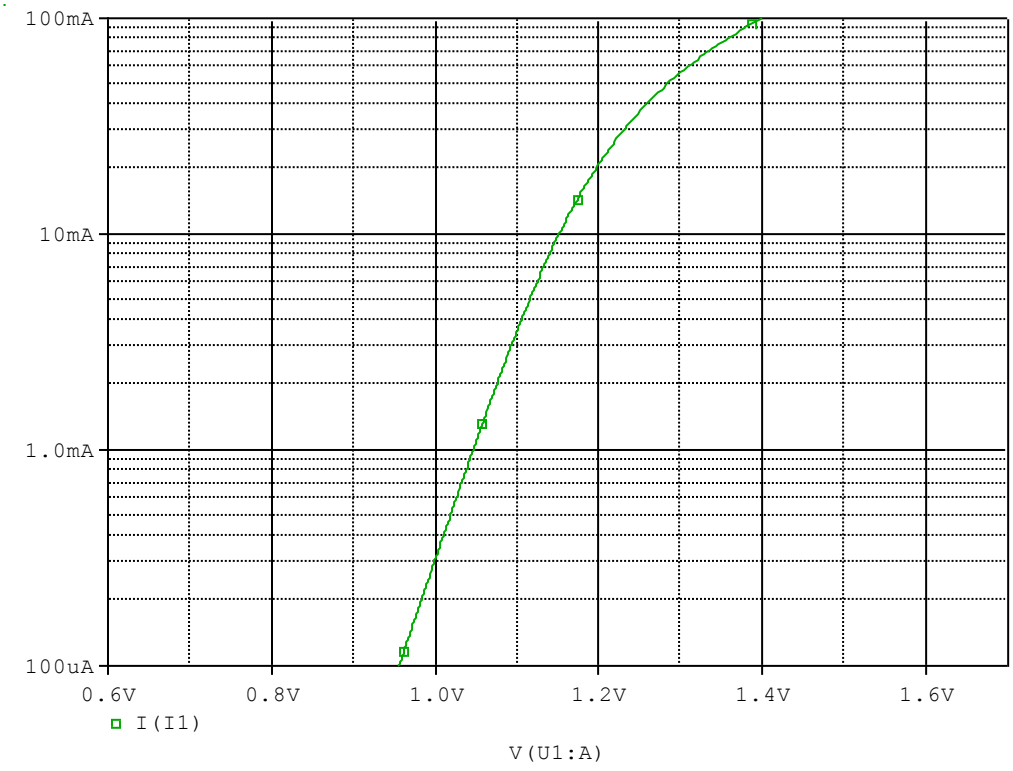
E<Name><(+)Node><(－)Node>VALUE={Expression}

CURRENT CONTROLLED MODEL(W)

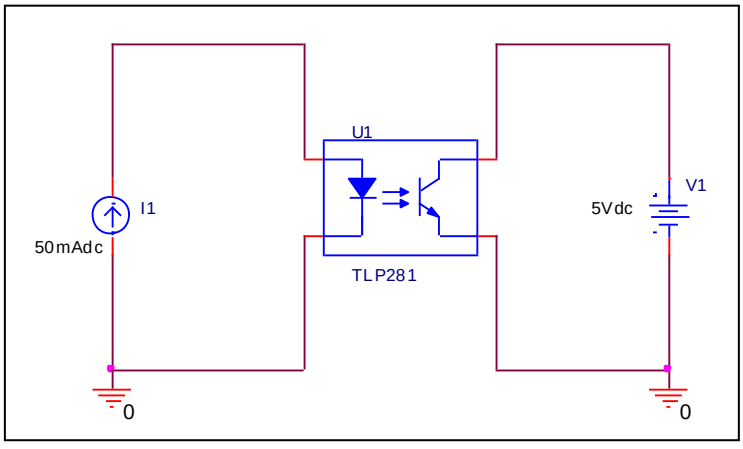
Pspice model parameter	Model description
IOFF	Controlling current to Off state
ION	Controlling current to On state
ROFF	Off Resistance
RON	On Resistance

LED IV Curve Characteristics

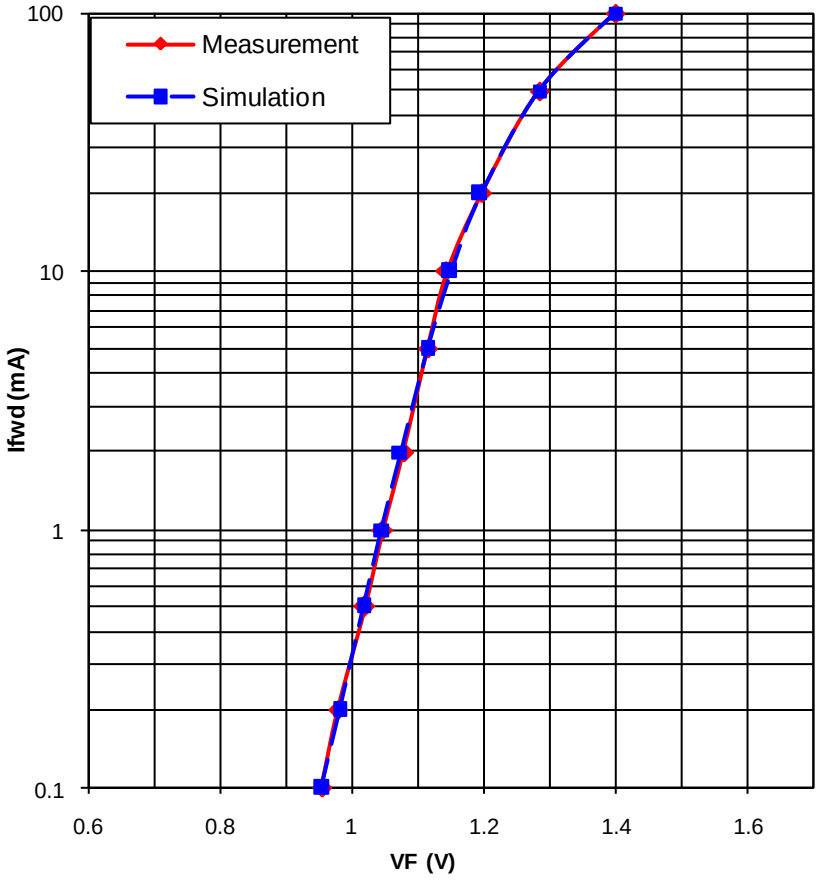
Simulation result



Evaluation Circuit



Comparison Graph

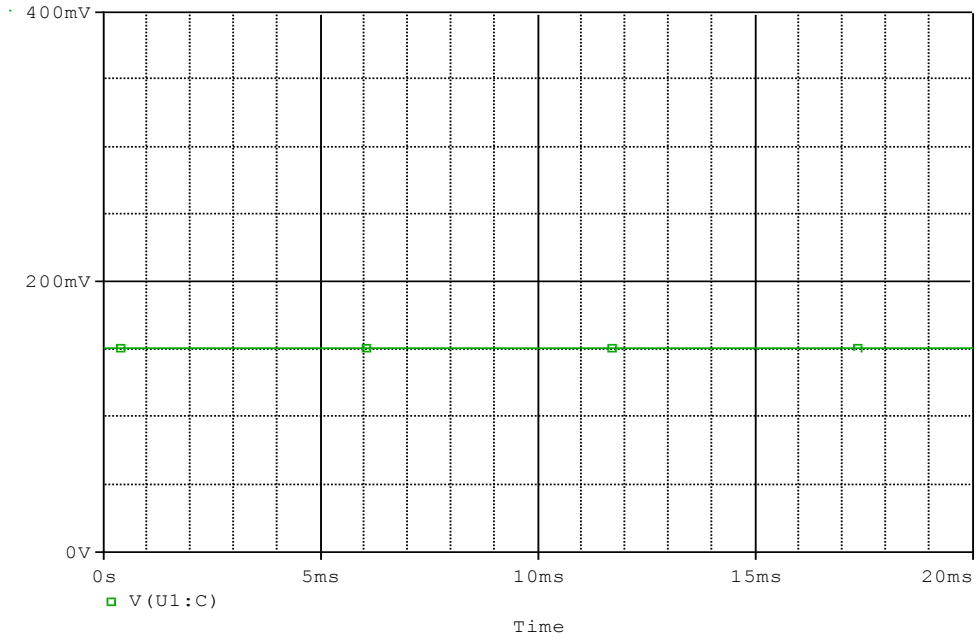


Comparison Table

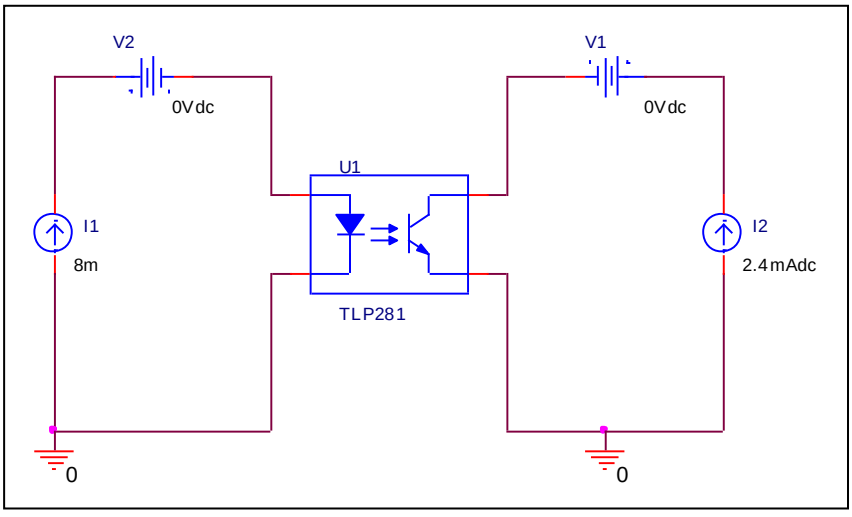
Ifwd (mA)	Vfwd(V)		% Error
	Measurement	Simulation	
0.100	0.955	0.956	0.052
0.200	0.980	0.982	0.204
0.500	1.020	1.019	-0.137
1.000	1.048	1.046	-0.153
2.000	1.079	1.075	-0.408
5.000	1.115	1.116	0.072
10.000	1.145	1.151	0.524
20.000	1.198	1.196	-0.192
50.000	1.285	1.285	0.008
100.000	1.400	1.400	0.007

Transistor Saturation Characteristics

Simulation result



Evaluation Circuit

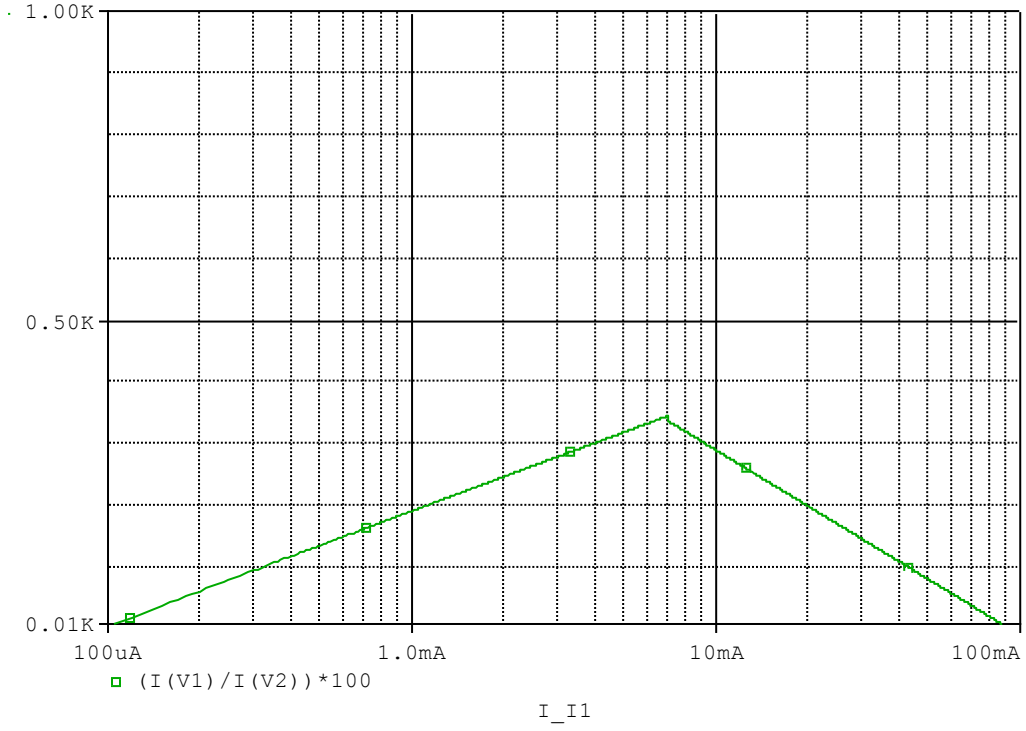


Comparison Table

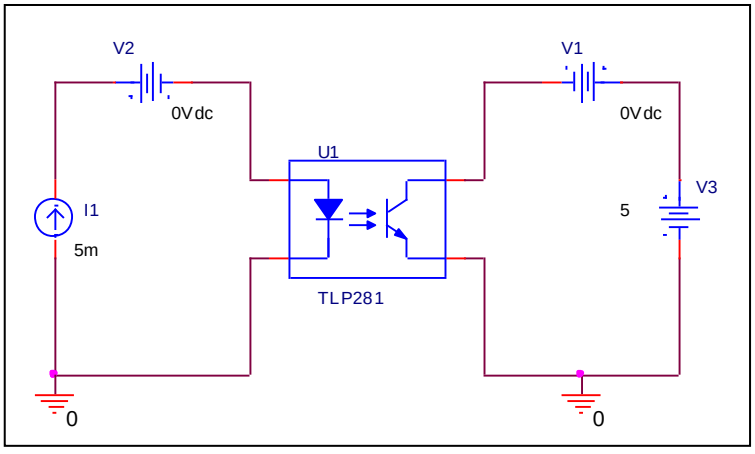
	Measurement	Simulation	% Error
$V_{CE(sat)}$ (V)	0.4 (Max)	0.151	-

CTR(Current Transfer Ratio) Characteristics

Simulation result



Evaluation Circuit



Rise Curve Table

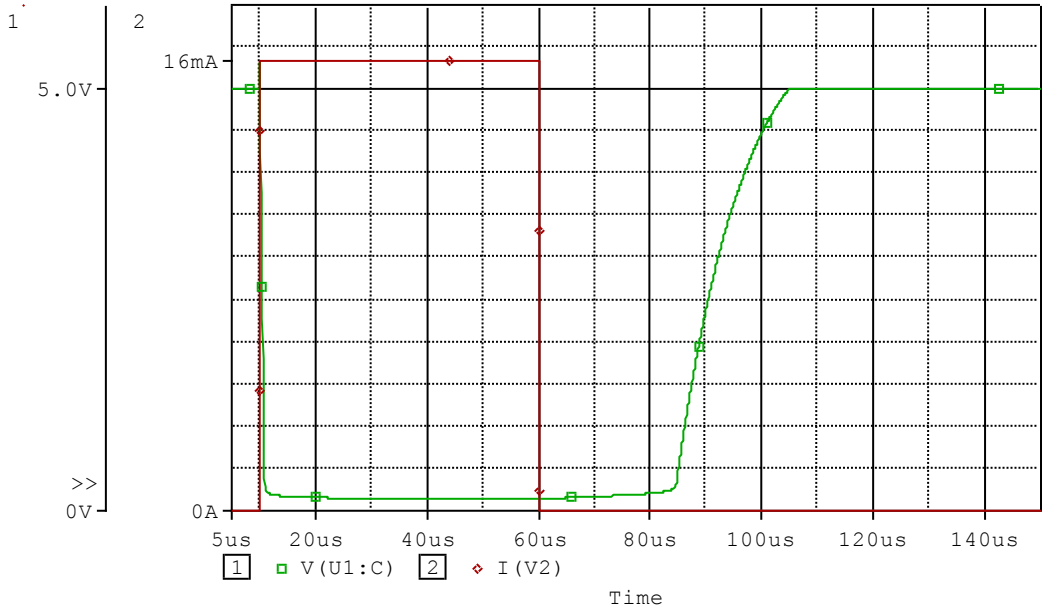
If (mA)	IO/IF		% Error
	Measurement	Simulation	
0.200	63.000	63.333	0.529
0.500	135.000	137.570	1.904
1.000	200.000	192.709	-3.646
2.000	260.000	247.500	-4.808
5.000	330.000	321.257	-2.649
7.000	340.000	346.793	1.998

Fall Curve Table

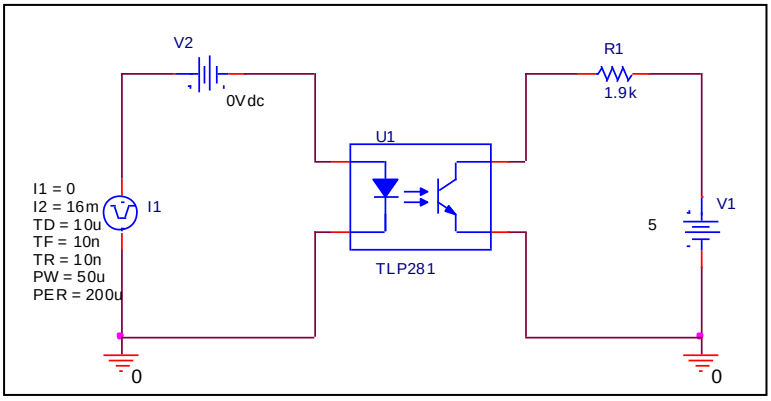
If(mA)	IO/IF		% Error
	Measurement	Simulation	
7.000	340.000	346.793	1.998
10.000	305.000	290.632	-4.711
20.000	193.000	201.031	4.161
50.000	86.000	82.046	-4.598

Switching Time Characteristics

Simulation result



Evaluation Circuit



Comparison Table

I_F=16mA, RL=1.9kΩ	Measurement	Simulation	% Error
t_S (us)	25.000	25.012	0.048
t_{OFF} (us)	40.000	40.056	0.140